

## PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 903249	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/JP 03/14949	International filing date (day/month/year) 21.11.2003	Priority date (day/month/year) 10.01.2003
International Patent Classification (IPC) or both national classification and IPC B60L11/12		
<p><b>Applicant</b> TOYOTA JIDOSHA KABUSHIKI KAISHA et al.</p>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

- I  Basis of the opinion
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand  08.10.2004	Date of completion of this report  17.03.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Roider, A Telephone No. +49 89 2399-2330



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/JP 03/14949

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-38 as originally filed

**Claims, Numbers**

1-19 received on 07.02.2005 with letter of 04.02.2005

**Drawings, Sheets**

1/13-13/13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-19
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-19
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

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**Re Item V** Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The Japanese patent JP2308935 is regarded as being the closest prior art to the subject-matter of claims 1, 6, 8, 12, 14 and 18. Figure 13 of the present application illustrates the prior art disclosed in this document. It is a power supply system a down converter, a power controlling device (inverter) and an electric load capable of generating electric power. A capacitor is connected between the down converter and the power controlling device.

The subject-matter of claims 1, 6, 8, 12, 14 and 18 differs from this prior art

in the first embodiment of the invention (claims 1, 8 and 14) by

*means (claim 1) and steps (claims 8 and 14) of outputting or generating (in the recording medium claim 8 and in the method claims 14) to a first control means (inverter) a command for instructing prohibition of electric power generation in the electric load when the down converter fails*

in the second embodiment of the invention (claims 6, 12 and 18) by

*means (claim 6) and steps (claims 12 and 18) outputting or generating (recording medium claim 12 and in the method claim 18) to the first control means a command for instruction an increase in an amount of power consumption in a second electric load, whereby said second electric load operates by receiving power that is generated by the first electric load*

The subject-matter of claim 1, 6, 8, 12, 14 and 18 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as preventing application of high voltage to the capacitor connected between the down converter and the power control means (inverter) when the down converter fails thereby protecting the capacitor from being damaged by too high voltage. A failure in the down converter would make the down converter unable to shunt off high voltage from the capacitor.

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The solution to this problem proposed in the above listed independent claims according to the first alternative solution resides in supressing power supply from the power generating load to the capacitor either entirely (*prohibition*) or partially (*decrease*) which is achieved by controlling the first control means correspondingly in case the down converter is faulted thereby drawing excessive power away from the lines to which the capacitor is connected. And according to the second alternative solution resides in an increase of power consumption of a second load by instructing the first control means correspondingly when the down converter is faulted thereby drawing excessive power away from the lines to which the capacitor is connected.

The subject-matter of the independent claims is considered as involving an inventive step (Article 33(3) PCT) because no prior art document on file considers any measure to prevent application of damaging voltage to the intermediate capacitor in case of down converter failure.

Claims 2-5, 7, 9-11, 13, 15-17 and 19 are dependent on claims 1, 6, 8, 12, 14 and 18 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Industrial applicability in the sense of PCT Article 33(4) of the claimed subject-matter is obviously possible.

The plurality of independent claims (six: two apparatus claims; two computer readable recording medium claims; two method claims) appears justified because an integration of the two alternative solutions into one claim (by an "or" conjunction) would make the wordings of the claims cumbersome and less comprehensible. Moreover, the two alternative solutions are clearly defined in the two groups of the claims, easily to be identified as such and discernable from each other (first group: 1, 8 and 14; second group: 6, 12 and 18).

## CLAIMS

1. (Amended) A voltage converting device comprising:  
an electric load (M1, M2, G1) having an electric power generating  
5 function;  
a capacitor (C2) connected to an input of said electric load (M1, M2,  
G1);  
a down-converter (12) down-converting a voltage of said capacitor  
(C2);  
10 first control means (14, 31, 18) controlling an amount of electric  
power generated by said electric load (M1, M2, G1); and  
second control means (30, 30A, 30B) outputting to said first control  
means (14, 31, 18) a command for instructing prohibition of electric power  
generation in said electric load (M1, M2, G1) or for instructing decrease in  
15 an amount of electric power generated by said electric load (M1, M2, G1),  
when said down-converter (12) fails.
2. The voltage converting device according to claim 1, wherein  
said down-converter (12) has a voltage-up-converting function.  
20
3. (Amended) The voltage converting device according to claim 1 or  
claim 2 wherein  
said electric load (M1, M2) is a motor having an electric power  
generating function,  
25 said second control means (30, 30A, 30B) outputs to said first control  
means (14, 31) a command for instructing restriction of a regenerative  
electric power generating function of said motor when said down-converter  
(12) fails, and  
said first control means (14, 31) restricts an amount of regenerative  
30 electric power generated by said motor based on said command.
4. (Amended) The voltage converting device according to claim 3,  
wherein

said second control means (30, 30A, 30B) outputs to said first control means (14, 31) a command for instructing prohibition of regenerative electric power generation of said motor, and

5        said first control means (14, 31) controls said amount of regenerative electric power generated by said motor to zero based on said command.

10      5. (Amended) The voltage converting device according to claim 3, further comprising another electric load (M1) different from said motor, wherein

15      10     said second control means (30B) outputs to said first control means (31) a command for instructing restriction of said amount of regenerative electric power generated by said motor to a value smaller than power consumption in said another electric load (M1), and

15      15     said first control means (31) restricts said amount of regenerative electric power generated by said motor based on said command.

20      6. (Amended) A voltage converting device comprising:  
25      a first electric load (G1, M2) having an electric power generating function;

20      20     a capacitor (C2) connected to an input of said first electric load (G1, M2);

25      25     a down-converter (12) down-converting a voltage of said capacitor (C2);

25      30     a second electric load (M1) that operates by receiving electric power generated by said first electric load (G1, M2);

30      30     first control means (14) controlling an amount of power consumption in said second electric load (M1); and

30      35     second control means (30A, 30B) outputting to said first control means (14) a command for instructing increase in an amount of power consumption in said second electric load (M1), when said down-converter (12) fails.

7. (Amended) The voltage converting device according to claim 6,

wherein

said second electric load (M1) is a motor,

said first control means (14) further controls torque of said motor,

said second control means (30A, 30B) outputs to said first control

5 means (14) a command for instructing said motor to output positive torque,  
and

said first control means (14) controls the torque of said motor to a  
positive value based on said command.

10 8. (Amended) A computer readable recording medium with a  
program recorded thereon for causing a computer to execute failure  
processing in a voltage converting device,

said voltage converting device including

15 an electric load (M1, M2, G1) having an electric power generating  
function,

a capacitor (C2) connected to an input of said electric load (M1, M2,  
G1), and

a down-converter (12) down-converting a voltage of said capacitor  
(C2), wherein

20 said program causes the computer to execute

a first step of generating a command for instructing prohibition of  
electric power generation in said electric load (M1, M2, G1) or for  
instructing decrease in an amount of electric power generated by said  
electric load (M1, M2, G1), when said down-converter (12) fails, and

25 a second step of controlling an amount of electric power generated by  
said electric load (M1, M2, G1) based on the command generated in said  
first step.

30 9. (Amended) The computer readable recording medium with a  
program recorded thereon according to claim 8, wherein

said electric load (M1, M2) is a motor having an electric power  
generating function, and

in said first step, a command for instructing restriction of a

regenerative electric power generating function of said motor is generated.

10. (Amended) The computer readable recording medium with a program recorded thereon according to claim 9, wherein

5       in said first step, a command for instructing prohibition of regenerative electric power generation of said motor is generated.

11. (Amended) The computer readable recording medium with a program recorded thereon according to claim 9, wherein

10       said voltage converting device further includes another electric load (M1) different from said electric load (M2, G1), and

15       in said first step of said program, a command for instructing restriction of an amount of regenerative electric power generated by said motor to a value smaller than power consumption in said another electric load (M1) is generated.

12. (Amended) A computer readable recording medium with a program recorded thereon for causing a computer to execute failure processing in a voltage converting device,

20       said voltage converting device including

      a first electric load (M2, G1) having an electric power generating function;

25       a capacitor (C2) connected to an input of said electric load (M2, G1),  
      a down-converter (12) down-converting a voltage of said capacitor (C2), and

      a second electric load (M1) that operates by receiving electric power generated by said first electric load (M2, G1), wherein

30       said program causes the computer to execute

      a first step of generating a command for instructing increase in an amount of power consumption in said second electric load (M1), when said down-converter (12) fails, and

      a second step of controlling an amount of power consumption in said second electric load (M1), based on the command generated in said first

step.

13. (Amended) The computer readable recording medium with a program recorded thereon according to claim 12, wherein  
5        said second electric load (M1) is a motor, and  
            in said first step of said program, a command for instructing said motor to output positive torque is generated when said down-converter (12) fails, and  
10        in said second step, the torque of said motor is controlled to a positive value based on the command generated in said first step.

14. (Amended) A failure processing method in a voltage converting device,

15        said voltage converting device including  
            an electric load (M1, M2, G1) having an electric power generating function,  
            a capacitor (C2) connected to an input of said electric load (M1, M2, G1), and  
20        a down-converter (12) down-converting a voltage of said capacitor (C2),  
            said failure processing method comprising:  
            a first step of generating a command for instructing prohibition of electric power generation in said electric load (M1, M2, G1) or for instructing decrease in an amount of electric power generated by said electric load (M1, M2, G1), when said down-converter (12) fails; and  
25        a second step of controlling an amount of electric power generated by said electric load (M1, M2, G1) based on the command generated in said first step.

30        15. (Amended) The failure processing method according to claim 14, wherein

            said electric load (M1, M2) is a motor having an electric power generating function, and

in said first step, a command for instructing restriction of a regenerative electric power generating function of said motor is generated.

5 16. (Amended) The failure processing method according to claim 15, wherein

in said first step, a command for instructing prohibition of regenerative electric power generation of said motor is generated.

10 17. (Amended) The failure processing method according to claim 15, wherein

said voltage converting device further includes another electric load (M1) different from said electric load (M2), and

15 in said first step of said failure processing method, a command for instructing restriction of an amount of regenerative electric power generated by said motor to a value smaller than power consumption in said another electric load (M1) is generated.

18. (Amended) A failure processing method in a voltage converting device,

20 said voltage converting device including

a first electric load (M2, G1) having an electric power generating function,

a capacitor (C2) connected to an input of said electric load (M2, G1),  
a down-converter (12) down-converting a voltage of said capacitor

25 (C2), and

a second electric load (M1) that operates by receiving electric power generated by said first electric load (M2, G1), wherein

said failure processing method comprising:

30 a first step of generating a command for instructing increase in an amount of power consumption in said second electric load (M1), when said down-converter (12) fails; and

a second step of controlling an amount of power consumption in said second electric load (M1), based on the command generated in said first

step.

19. (Amended) The failure processing method according to claim 18,  
wherein

5        said second electric load (M1) is a motor, and  
          in said first step of said failure processing method, a command for  
          instructing said motor to output positive torque is generated when said  
          down-converter (12) fails, and  
10        in said second step, the torque of said motor is controlled to a positive  
          value based on the command generated in said first step.